Thames Valley District School Board

2014 - 2019 CONSERVATION AND DEMAND MANAGEMENT PLAN

1. Facility and Utility Consumption Background

The Thames Valley District School Board has just over 10.9 million square feet of buildings, which includes: 134 elementary schools, 28 secondary schools, plus administrative and maintenance buildings.

2. 2012/2013 Utility Usage

72,338,030 kWh of Electricity

12,631,942 cubic metres of Natural Gas

65,267 Litres of #2 Fuel Oil

45,512 Litres of Propane

For a more detailed view of energy consumption, please review the 2012/2013 Energy Consumption and Greenhouse Emissions Report.

3. Energy Management Objectives and Goals

3.1. TVDSB's Conservation and Demand Management Plan has four major objectives:

- To procure energy commodities required by the Board at the lowest possible price, while ensuring budget stability.
- To research, evaluate and install building systems that reduce energy consumption.
- To research and evaluate emerging energy strategies and implement pilot projects where appropriate.
- To monitor and track energy usage to ensure our facilities are operating effectively and efficiently.

3.2. Goals

To continue to reduce energy consumption through:

- Effective management of buildings.
- Increase efficiency of buildings and equipment when replacing components at end of lifecycle.
- Replace equipment components prior to end of lifecycle, when new technologies and methods provide significant improvements over current conditions.

4. Past Energy Management Investments

4.1. Ameresco Energy Management Agreement

From 2001 – 2008 there was an Energy Management Agreement in place between TVDSB and Ameresco Canada, this has allowed for $5.4M yearly savings to TVDSB. Energy Management projects completed through this initiative included upgrades and replacements to: lighting, building controls, boilers, HVAC equipment and implementation other energy savings measures.

4.2. Energy Efficiency for Schools Funding

In 2009, The Ministry of Education released $14.2M to TVDSB as part of the Energy Efficiency Schools Program. Energy Efficient Schools funding was spent on various building renewal projects including: window and entranceway replacement, roof insulation upgrades, installation of low flow plumbing fixtures, as well as lighting, HVAC and boiler upgrades.

5. Green and Renewable Energy Projects

5.1. Green Energy Pilot Initiative Funding

TVDSB applied for and was approved for funding from the Ministry of Education to purchase, test and showcase new and innovative green products and technologies.

H.B. Beal Secondary School - Capstone Microturbine Cogeneration System

The Microturbine was installed in 2010 and produces 435,000 kWh per year of electricity that is used within the school. 2915 GJ of heat is recovered and offsets boiler usage. To do this the unit consumes 6120 GJ of natural gas. The approximate yearly savings is $30,000. Due to current energy trends, there is a high probability that this savings will increase on a yearly basis for at least the next 2 - 3 years.

5.2. Renewable Energy Funding for Schools

The Ministry of Education released funding for projects involving renewable energy technologies at school board facilities. TVDSB applied for, and was approved to install 7 Solar Photovoltaic Systems of varying sizes and designs.

5.2.1. East Oxford Central Public School – 20kW Rooftop Solar Photovoltaic System

The system at this school is connected to the power grid, but was not able to obtain a contract in the FIT Program. Current electricity production offsets the schools usage. Yearly energy production is expected to be 26 mWh.

5.2.2. Clarke Road Secondary School – 20kW Rooftop Solar Photovoltaic System

The system at this school is connected to the power grid, but was not able to obtain a contract in the FIT Program. Current electricity production offsets the schools usage. Yearly energy production is expected to be 21 mWh.

5.2.3. Parkside Collegiate Institute – 40kW Rooftop Solar Photovoltaic System

The system at this school is grid connect, but was not able to obtain a contract in the FIT Program. Current electricity production offsets the schools usage. Yearly production is expected to be 50 MWh.

5.2.4. West Elgin Secondary School – 10kW Ground Mounted Solar Photovoltaic System

The system at this school is grid connect, but was not able to obtain a contract in the Micro-FIT Program due to system constraints external to TVDSB. The system runs corridor lighting within the school, via a set of inverters that draw off of a Battery system, which is charged via the Solar Photovoltaic system. Yearly energy production is 5.6 mWh.

5.2.5. College Avenue Secondary School – 10kW Ground Mounted Solar Photovoltaic System

The system at this school is grid connect and has a Micro-FIT contract. Yearly energy production is approximately 13.9 mWh.

5.2.6. Sir Frederick Banting Secondary School – 10kW Ground Mounted Solar Photovoltaic System

The system at this school is grid connect and has a Micro-FIT contract. Yearly energy production is approximately 15.9 mWh.

5.2.7. Saunders Secondary School – 10kW Wall Mounted Solar Photovoltaic System

The system at this school is grid connect and has a Micro-FIT contract. Yearly energy production is approximately 8.5 mWh.

6. Energy Management Projects and Programs

The overall energy intensity of TVDSB's open facilities is 191 ekWh/m^2. TVDSB's new or newly renovated facilities operate at an average of 137 ekWh/m^2. Each ekWh/m^2 that TVDSB's energy intensity is reduced requires a significant investment.

This investment is planned through renewal of buildings and their associated equipment, as found in the results of the Total Capital Planning Solutions (TCPS) facility audits.

A 6.5% reduction in energy intensity in the next 5 years is achievable if current renewal budgets are maintained.

6.1. 2013/2014 Projects

6.1.1. Glen Cairn Public School - Lighting Upgrade

- Replace existing Metal Halide gym lighting with LED lighting controlled by occupancy sensors.
- Replace existing Fluorescent pot lighting in corridors and entrances with LED replacement fixtures.
- Replace Library Metal Halide up lighting with LED down lighting to improve light quality, while providing and energy savings. Install Occupancy/daylighting sensors to maintain a consistent light level when occupied.
- Replace Metal Halide lighting in main open storey foyer with LED with Daylighting control.
- The capital cost of the project is $122,000
- The calculated savings of the project is $6,250 per year with a life expectancy of fixtures to be 16+ years.
- Other benefits will be increased light levels in most areas and reduced maintenance costs due to fixture life.

6.1.2. Southwold Public School - Urinal Replacement

- Replace old tank flush urinal system with low flush urinals and electronic flush valves.
- Project cost is $60,000.
- Project savings have been calculated to be $1150 per year with a life expectancy of 25+ years.

6.1.3. Westminster Secondary School - Boiler and Cooling Tower Replacement

- End of life replacement of boilers, domestic water heater/storage tank and cooling tower. Boilers will be replaced with modulating, non-condensing boilers cast iron sectional boilers. The domestic water heater will be replaced with a hot water boiler and storage tank system that is appropriately sized for schools requirements. The new cooling tower will be fitted with VFD fan system to reduce energy consumption.
- Project cost is $742,000
- Estimated cost savings of $10,400 per year in natural gas and an electrical savings of between $250 and $500 per year. The expected lifespan of equipment installed in this project is 25-35 years.

6.1.4.Annandale Public School - Renovations

- The school is being renovated to accommodate an Elementary school. Energy savings items include: removal of electric make up air heating and replacing with hydronic heat, replacement of exterior lighting with LED lighting, Installation of new T-8 high efficiency light fixtures and classroom occupancy sensors. The unit ventilators and lighting have an expected life of 15-25 years.

6.1.5.J.S. Buchanan French Immersion Public School – Addition/Renovations

- The school is being renovated as part of its change to a French Immersion Elementary school. Energy savings items within the project are: replacement of boiler with 2 aluminum condensing boilers, replacement of domestic water heater condensing domestic water heater. Expected life span of these items is 15-25 years.

6.1.6.Woodstock Collegiate Institute – Window and Entranceway Replacement

- Replacement of windows and entranceways in the 100 year old school.
- The capital cost of the project is $875,000 and the savings calculate to be approximately $13,000 per year.
- The expected lifespan of the new windows and entranceways is to be 25-30 years.

6.1.7.West Oaks French Immersion Public School - Addition/Renovations

- The school is being renovated as part of its change to a French Immersion Elementary school. Energy saving items within the project are: replacement of boilers with 2 aluminum condensing boilers, replacement of domestic water heater condensing domestic water heater, all lighting to be replaced with LED and current unit ventilators will be replaced with a make-up air unit and water source heat pumps.

6.2. 2014/15 – 2018/19

6.2.1.Energy Management Budget

The planned budget for Energy Management projects is $500,000 per year.

6.2.1.1. Lighting Upgrades:

- Over the next 5 years, the plan is to replace any remaining Metal halide lighting at a rate of 5 schools per year. TVDSB will replace the Metal halide lights with 6 lamp T8 fixtures that are controlled by occupancy sensors. Average project cost for 1 gym is approximately $10,000 and provides a yearly energy savings of $1000. Side benefits of the installation are improved light distribution, improved light quality and reduced maintenance costs.
- With the price of fluorescent lamps increasing on a yearly basis due to shortages of rare earth elements, TVDSB is seriously looking at starting to replace T8 Fluorescent fixtures with LED fixtures. The LED fixtures offer lower energy use, more functionality, longer life, and costs are continually reducing making them the ideal choice for the next step in lighting energy efficiency.

6.2.1.2. Building Automation Upgrades

- Schools that are not upgraded to current standards will be upgraded when possible and existing systems will be expanded to encompass more equipment. An up to date BAS reduces the effort to continually verify that you HVAC/lighting systems are working correctly and to an appropriate schedule.

6.2.2. School Renewal Budget

TVDSB increases building efficiency during normal building renewal projects when reasonably possible.

6.2.2.1. Rooftop HVAC Unit Renewal Program

- Upgrade units with modulating heating and cooling systems
- Installation of ERV's when possible, either internal or external to the rooftop unit

6.2.2.2. Boiler Renewal Program

- Depending on application and system design, aluminum condensing boilers or modulating cast iron sectional boilers are installed to replace existing boilers that are at the end of their lifecycle. Energy usage can be reduced from 25-40% from existing in these projects.

6.2.2.3. Window and Door Replacement Program

- Use of argon gas filled insulating glass units reduces heat loss through the window.
- Better installation methods reduce air infiltration from around the window.

6.2.2.4. Roof Inspection and Replacement Program

- Once a roof has started to leak, the existing insulation does not perform and heat loss increases. The use of thermographic cameras to identify areas that have saturated insulation and require remediation work or complete roof system replacement
- Where possible roof insulation thickness is increased to reduce heat loss from the building.

SUMMARY

TVDSB Facility Services will continue to aggressively purchase energy commodities, search out and implement new energy conservation equipment, measures and operating procedures. To ensure that our plan is successful, continued tracking and monitoring of all consumption will be a priority to validate Facility Services goal to conserve energy wherever possible and feasible. Any Green and Renewable Energy Technology will be investigated to ensure the benefit that it may provide TVDSB.

Senior Management Approval:

Kevin Bushell, Executive Officer
Facility Services and Capital Planning